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Scientific and Technical Subcommittee
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Draft report

V. Space debris

1. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 8, entitled "Space debris".

2. The representatives of Canada, Chile, China, Egypt, Germany, India, Indonesia, Japan, Mexico, Pakistan, the Russian Federation, Slovakia, Ukraine, the United Arab Emirates, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 8. A statement was made under the item by the representative of Argentina on behalf of the Group of Latin American and Caribbean States. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

3. The Subcommittee heard the following scientific and technical presentations:

(a) "The Inter-Agency Space Debris Coordination Committee (IADC): an overview of IADC annual activities", by the representative of Japan;

(b) "United States space debris environment, operations and research updates", by the representative of the United States;

(c) "Space debris mitigation activities at ESA in 2017", by the observer for ESA;

(d) "Technical proposals for space debris remediation (including the International Space Station as testbed platform)", by the observer for NSS.

4. The Subcommittee had before it information on national research on space debris, the safety of space objects with nuclear power sources on board and problems relating to the collision of such objects with space debris, in replies received from Member States and international organizations (A/AC.105/C.1/113 and A/AC.105/C.1/2018/CRP.10).

5. The Subcommittee noted with satisfaction that the endorsement by the General Assembly, in its resolution 62/217, of the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space had proved vital in controlling the space debris problem for the safety of future space missions.

6. The Subcommittee also noted with satisfaction that many States and international intergovernmental organizations were implementing space debris

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mitigation measures consistent with the Space Debris Mitigation Guidelines of the Committee and/or the Space Debris Mitigation Guidelines of IADC and that a number of States had harmonized their national space debris mitigation standards with those guidelines.

7. The Subcommittee noted that some States were using the Space Debris Mitigation Guidelines of the Committee, the European Code of Conduct for Space Debris Mitigation, International Organization for Standardization standard 24113:2011 (Space systems: space debris mitigation requirements) and ITU recommendation ITU-R S.1003 (Environmental protection of the geostationary-satellite orbit) as reference points in their regulatory frameworks for national space activities.

8. The Subcommittee also noted that, in the area of space debris, some States had cooperated in the space surveillance and tracking support framework funded by the European Union and in the ESA space situational awareness programme.

9. The Subcommittee expressed concern at the increasing amount of space debris and encouraged States as well as agencies, industries and academic institutions that had not yet done so to consider voluntarily implementing the Space Debris Mitigation Guidelines of the Committee.

10. The Subcommittee noted that IADC, whose initial work had served as the basis for the Space Debris Mitigation Guidelines of the Committee, continued its work to characterize the space debris environment and evaluate improvements to its own Space Debris Mitigation Guidelines.

11. The Subcommittee noted with appreciation that States had adopted a number of concrete actions to mitigate space debris, including the improvement of the design of launch vehicles and spacecraft, the development of specific software, the reorbiting of satellites, passivation, life extension, end-of-life operations and disposal. The Subcommittee also noted the evolving technologies related to the in-orbit robotic servicing of satellites, the extension of satellite lifespans and active space debris removal.

12. The Subcommittee noted the development and application of new technologies and ongoing research related to space debris mitigation; collision avoidance; protecting space systems from space debris; limiting the creation of additional space debris; re-entry and collision avoidance techniques; measuring, characterizing, continuous monitoring and modelling of space debris; prediction, early warning and notification of space debris re-entry and collision; and space debris orbit evolution and fragmentation.

13. Some delegations expressed the view that space debris issues should be addressed in a manner that would neither impose an undue burden on the space programmes of developing nations nor jeopardize the development of the space capabilities of those States.

14. Some delegations expressed the view that countries with advanced space programmes should assume their responsibilities for space debris mitigation and removal to ensure that the mitigation and removal costs were not passed on to countries with emerging space capabilities.

15. Some delegations expressed the view that it was important that States with developed space programmes complied with their responsibilities to provide complete and timely information and prevented the creation of space debris, mitigated and removed space debris appropriately, and provided special assistance measures to those countries with incipient or non-existent space programmes that could potentially be affected by space debris.

16. The view was expressed that, as space debris had been created by the earlier operations of spacefaring nations, those nations had a responsibility and an obligation to assist others in the full implementation of space debris mitigation guidelines.

17. The view was expressed that, in addressing space debris issues, States should act in line with the principle of common but differentiated responsibilities, which was based on the recognition of historical differences in the contributions of developed and developing States to the creation of space debris and the acknowledgement of differences in States' economic and technical capacities.

18. The view was expressed that all States carrying out outer space activities should act in a responsible manner in order to maintain the safety and the sustainability of such activities.

19. The view was expressed that all issues related to space debris needed to be considered thoroughly, taking into account the concerns and interests of all States, and be agreed by consensus.

20. Some delegations expressed the view that the Safety Framework for Nuclear Power Source Applications in Outer Space and the Space Debris Mitigation Guidelines of the Committee were documents that could enrich the activities of the Legal Subcommittee and the work of the Committee in promoting the safety and sustainability of activities in outer space.

21. The view was expressed that cooperation between the Scientific and Technical Subcommittee and the Legal Subcommittee should result in the development of legally binding rules for the handling of space debris.

22. The view was expressed that the Space Debris Mitigation Guidelines of the Committee should incorporate the results and good practices consolidated by the Working Group on the Long-term Sustainability of Outer Space Activities that related to space debris, with a view to developing a new set of United Nations principles on space debris mitigation.

23. Some delegations expressed concern that developments in the field of small satellites and the emergence of large satellite constellations heightened the risk of further growth in the amount of space debris and increased the risk of collision.

24. The view was expressed that States should develop innovative technologies and sensing capabilities to improve the global space situational awareness of space debris objects.

25. The view was expressed that, in order to stop the increasing concentration of debris, it was necessary to make sure that every new satellite and launch vehicle was properly and effectively removed at the end of its life, and that future strategies could include removing, recycling and reusing defunct satellites in outer space.

26. The view was expressed that, prior to undertaking any active space debris disposal activities, it was important to ensure the following: (a) the full implementation of transparency and confidence-building measures; (b) the involvement of all stakeholders, either directly or through the Secretary-General; and (c) the fulfilment of procedures such as licensing, export control and insurance, as stipulated in the legislation of participating States.

27. The view was expressed that it was important for the international community to work together to identify and reduce the barriers and risks relating to feasible orbital debris removal missions, and that increased international understanding on the appropriate framework for those missions would be essential for the effective use of outer space.

28. The view was expressed that the criteria and procedures for active removal or intentional destruction of space objects needed to be thoroughly deliberated upon under the auspices of the United Nations to ensure acceptability by stakeholders.

29. Some delegations expressed satisfaction with the increasing technical cooperation and voluntary data-sharing, which were important for effective and efficient monitoring of space debris and for the implementation of mitigation measures to contain the threats posed by space debris.

30. The view was expressed that cooperation between spacefaring countries and countries with emerging space capabilities needed to be strengthened in order to accommodate the transfer of knowledge, capacity improvement, and the sharing of data, information and analysis methods.

31. The view was expressed that data on all natural and launched space objects in near-Earth orbit should be shared so that States and international organizations could perform conjunction assessments for their in-orbit space objects, and that a centre for monitoring near-Earth space under the auspices of the United Nations could be established.

32. Some delegations expressed the view that it was essential for all information related to the entry of space debris into the atmosphere to be communicated with diligence and promptness to those countries that might be affected and that cooperation mechanisms should be intensified to enable necessary measures to prevent and mitigate damage to property and persons.

33. The view was expressed that information related to the entry of space debris into the atmosphere should cover the tracks and re-entry potential of that debris, the probability of re-entry in a particular area or country, the potential damage if the debris fell outside the predicted area, the prediction method employed and the supporting data used.

34. The Subcommittee noted with satisfaction that the compendium of standards adopted by States and international organizations to mitigate the creation of space debris, which had been initiated by Canada, Czechia and Germany, was being continuously updated and could be consulted on the website of the Office for Outer Space Affairs. The Subcommittee encouraged Member States to provide contributions and updates to the compendium.

35. The Subcommittee took note of paragraph 12 of General Assembly resolution 72/77 and agreed that Member States and international organizations having permanent observer status with the Committee should continue to be invited to provide reports on research on space debris, the safety of space objects with nuclear power sources on board, problems relating to the collision of such space objects with space debris and the ways in which debris mitigation guidelines were being implemented.

X. Use of nuclear power sources in outer space

36. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 13, entitled "Use of nuclear power sources in outer space".

37. The representatives of China, Mexico, Pakistan, the Russian Federation, the United States and Venezuela (Bolivarian Republic of), as well as the representative of Argentina, on behalf of the Group of Latin American and Caribbean States, made statements under agenda item 13. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

38. The Subcommittee heard a scientific and technical presentation entitled "Preliminary safety research on nuclear power sources", by the representative of China.

39. The Subcommittee noted with satisfaction that some States and an international intergovernmental organization were developing, or considering developing, legal and regulatory instruments on the safety of the use of nuclear power sources in outer space, taking into account the contents and requirements of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space and of the Safety Framework for Nuclear Power Source Applications in Outer Space.

40. The Subcommittee stressed the value and importance of implementing the voluntary Safety Framework for Nuclear Power Source Applications in Outer Space,

which had been developed by the Subcommittee together with the International Atomic Energy Agency.

41. The view was expressed that the Safety Framework should provide all the necessary information pertinent to the challenges of using nuclear power sources that were faced by member States and other actors.

42. The view was expressed that the effects of the use of nuclear power sources in outer space on humans and the environment had not been identified, that there was still no clearly defined regulatory framework for establishing the responsibilities of States with regard to the use of nuclear power sources and that potentially critical situations arising from irresponsible practices in that area had not been addressed. The delegation expressing that view was also of the view that, in that connection, the Safety Framework in its current form was still insufficient.

43. The view was expressed that, to date, the Working Group on the Use of Nuclear Power Sources in Outer Space had not identified any challenges to implementing the Safety Framework that would require any modifications or additions to it. The delegation expressing that view was also of the view that the Safety Framework represented a significant advance in the development of safe nuclear power source applications and that the implementation of it by Member States and international intergovernmental organizations would provide assurance to the global public that nuclear power source applications for use in outer space were being developed, launched and used in a safe manner. Therefore, the national implementation of the Safety Framework should be strongly encouraged.

44. Some delegations expressed the view that it was important to continue to study, analyse and evaluate various aspects, practices and regulations pertinent to the use of nuclear power sources in space, and that such activities must be beneficial, not detrimental, to humanity. The delegations expressing that view were also of the view that States were responsible for regulating the use of nuclear energy in space and that it was their duty to observe the relevant international legal regime. In that connection, and taking into account the Safety Framework, it was important for the Subcommittee to continue addressing the issue through the application of appropriate strategies, long-term planning and the establishment of adequate and updated regulatory frameworks.

45. Some delegations expressed the view that more consideration should be given to the use of nuclear power sources in terrestrial orbits, specifically in the geostationary orbit and low Earth orbit, in order to address the problem of potential collisions of nuclear-powered space objects in orbit and the incidents or emergencies that could be created by the accidental re-entry of such objects into the Earth's atmosphere, as well as the impact of such a re-entry on the Earth's surface, human life and health and the ecosystem.

46. Some delegations expressed the view that nuclear power sources should be used on board spacecraft only for deep space missions, or when their use was unavoidable.

47. The view was expressed that the Sun was a source of energy that could effectively serve present and future needs of humankind in the areas of satellite applications, such as Earth observation, telecommunications, tele-health and tele-education.

48. The view was expressed that the use of space nuclear power sources was an important factor in enabling a broader scale of outer space exploration and the undertaking of a wide spectrum of tasks in deep space that required the use of the power-consuming and efficient sources of energy.

49. Some delegations expressed the view that, for more than five and a half decades, nuclear power source applications had played a critical role in the exploration of space, enabling missions of scientific discovery to destinations across the solar system.

50. The view was expressed that the efforts of the Working Group on the Use of Nuclear Power Sources in Outer Space to meet the objectives of its multi-year

workplan would further the safe development and use of nuclear power sources in space.

51. Pursuant to General Assembly resolution 72/77, the Subcommittee, at its 875th meeting, on 29 January, reconvened its Working Group on the Use of Nuclear Power Sources in Outer Space, with Sam A. Harbison (United Kingdom) as Chair.

52. The Working Group on the Use of Nuclear Power Sources in Outer Space held [...] meetings. At its [...] meeting, on [...] February, the Subcommittee endorsed the report and recommendations of the Working Group, including its new multi-year workplan (contained in annex [...], paragraph [...], to the present report).